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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/622,710	07/18/2003	Rodney John Davies	SAND 2774	2958
7812	7590	07/05/2006	EXAMINER	
SMITH-HILL AND BEDELL, P.C. 16100 NW CORNELL ROAD, SUITE 220 BEAVERTON, OR 97006			BOMAR, THOMAS S	
			ART UNIT	PAPER NUMBER
			3672	

DATE MAILED: 07/05/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/622,710

Applicant(s)

DAVIES, RODNEY JOHN

Examiner

Shane Bomar

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 11 April 2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 13-27 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 13-27 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 11 April 2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 101

1. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.
2. Claims 19 and 20 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter. The claims claim an operator, which is a human and is non-statutory. It is suggested that, in light of the limitations in claim 14, that the claims be amended to claim --the operator station-- so that the claims are no longer directed to non-statutory subject matter.

Claim Rejections - 35 USC § 103

3. Claims 13, 14, 16-20, and 24-27 are rejected under 35 U.S.C. 103(a) as being unpatentable over US patent 4,122,683 to Follert et al in view of US patent 5,501,548 to Hayashi et al, and further in view of US patent 4,576,515 to Morimoto et al.

Regarding claims 13, 14, and 27, Follert et al teach a tunneling machine that includes a boring head 10 having forward and rearward ends, a boring bit 13 at the forward end, and an inherent drive motor, wherein the bit and its drive shaft are adjustable relative to the head in two directions that are substantially perpendicular to each other (see Fig. 1 and col. 3, lines 10-12). However, it is not taught specifically how the system is guided, and, more particularly, it is not taught that the system uses laser beam guidance. It is noted that the term micro-tunneling machine has not been defined within claim 1, therefore that limitation has not been given any patentable weight and the claim has been examined in light of only the structural limitations presented.

Hayashi et al teach a guidance system for the boring head of a tunneling machine similar to that of Follert et al. It is further taught that the endmost part of the drive has a target 10 for the laser beam 9, means 15 to convey an image of the target and the laser strike position thereon to an operator station 24 situated remotely from the boring head, and input means 26 for use by the operator station to adjust the direction of the endmost part of the drive (see Figs. 1 and 3, col. 5, lines 1-31, and col. 6, line 17 through col. 7, line 6). It would have been obvious to one of ordinary skill in the art, having the teachings of Follert et al and Hayashi et al before him at the time the invention was made, to modify the guidance system taught by Follert et al to include the laser beam guided system of Hayashi et al, in order to obtain a system that adjusts automatically the direction of advance of the machine. One would have been motivated to make such a combination since the two references address the narrow problem of steering tunneling machines while in the hole, therefore a person of ordinary skill in the art seeking to solve that exact problem would look to these references and combine their teachings together. Furthermore, the combination would provide a signal indicative of the direction and amount of displacement of the tunneling machine based on the displacement of the spot of the laser beam from the origin, thereby making the guidance process more precise and accurate (see coil. 4, lines 21-30 of Hayashi et al).

Nevertheless, this combination does not explicitly teach the new limitations added to the claims, wherein it is claimed that there is a liquid supply means for supplying water through a hollow drive shaft to the boring bit, and a slurry removal means for removing slurry to a location rearward of the head. Morimoto et al teach a machine for tunneling similar to that of the combination. It is further taught that the bit 12 has a liquid supply means 50 for supplying water

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through a hollow drive shaft 46 to the boring bit 12, and a slurry removal means 40/58/60/62 for removing slurry to a location rearward of the head (see Figs. 1-3; col. 5, line 37 through col. 6, line 40). It would have been obvious to one of ordinary skill in the art, having the teachings of the combination and Morimoto et al before him at the time the invention was made, to modify the bit taught by the combination to include the hollow drive shaft, liquid supply, and slurry removal means of Morimoto et al, in order to obtain a machine that can excavate a tunnel without requiring any increase in the propelling force when the length of the tunnel increases greatly in length (see col. 3, lines 3-11 of Morimoto et al). One would have been motivated to make such a combination since the two references address the narrow problem of excavating subterranean tunnels with boring machines that have a drive motor substantially adjacent the boring head, therefore a person of ordinary skill in the art seeking to solve that exact problem would look to these references and combine their teachings together.

Regarding claim 16, the combination teaches that the shaft 46 has outlet apertures 30 for discharging water at the face (see Fig. 2).

Regarding claim 17, the combination teaches that the means to convey the image is a video camera 15 (see col. 6, lines 17-29 of Hayashi et al).

Regarding claim 18, the combination teaches that the target is a surface against which the laser is visible in contrast (see col. 5, lines 51-55 of Hayashi et al).

Regarding claim 19, the combination teaches that the target has markings to help the operator station to center the direction of the boring bit (see Fig. 4 and col. 5, lines 25-55 of Hayashi et al).

Regarding claim 20, the combination teaches that the input means for the operator station inherently comprises switches for controlling adjusters 3a and 3b which act on the drive shaft (see col. 5, line 56 through col. 6, line 14 of Hayashi et al), wherein it is inherent that the input means be switches because the operator is at a remote location and switches are a notoriously known way for operating machinery from a remote location.

Regarding claims 22 and 23, the combination teaches that the adjusters 3a and 3b are a pair of rams (see Fig. 2 and col. 5, line 56 through col. 6, line 14 of Hayashi et al) inherently connectable to a supply of water and to a drain, as is notoriously known in the hydraulic ram art, wherein the rams have in and out ports.

Regarding claim 24, the combination teaches that the boring head is in the range of 200-800mm in diameter (see col. 8, lines 4-7 of Morimoto et al).

Regarding claim 25, the bore rate is inherently between 9-95 ft/hr since it is notoriously known in the art that bore rate is largely dependent on the type of earth being bored (i.e., rock or soil), therefore the apparatus disclosed by the combination could operate in this range depending on the type of formation being bored.

Regarding claim 26, the combination teaches that the input means includes input signals from an imaging system that uses the camera image to compare the bore direction indicated by the target with the laser beam direction and operates switches (see col. 6, lines 17-67 of Hayashi et al) until the operator station assumes manual control at such time where the laser spots have moved a center distance from the origin (see col. 6, lines 62-67 of Hayashi et al).

4. Claims 13-20, 22, 23, and 25-27 are rejected under 35 U.S.C. 103(a) as being unpatentable over US patent 5,890,771 to Cass in view of Hayashi et al.

Regarding claims 13, 14, and 27, Cass teaches a tunnel boring machine that includes a boring head 46 having forward and rearward ends, a boring bit 26 at the forward end, and an inherent drive motor, wherein the bit and its drive shaft are adjustable relative to the head in two directions that are substantially perpendicular to each other (see Figs. 1-3 and 10-11, and col. 20, line 65 through col. 21, line 48). However, as with the previous prior art rejection it is not taught specifically how the system is guided, and, more particularly, it is not taught that the system uses laser beam guidance. Nor are the new limitations, as noted above, specifically taught by this reference. It is again noted that the term micro-tunneling machine has not been defined within claim 1, therefore that limitation has not been given any patentable weight and the claim has been examined in light of only the structural limitations presented.

Therefore, Hayashi et al and Morimoto et al can analogously, and advantageously, be applied to Cass to reach a comparable combination. Claims 16-20, 22, 23, 25, and 26 are also analogously rejected in view of this combination. Furthermore, Cass teaches the limitations of claim 15 by providing an operator station and a drive motor 108 to the rear of the boring head 46 (see col. 13, lines 61-63).

5. Claim 21 is rejected under 35 U.S.C. 103(a) as being unpatentable over Follert et al, or Cass, in view of Hayashi et al and Morimoto et al as applied to claim 20 above, and further in view of US patent 5,361,854 to Tull et al.

The combinations applied to claim 20 above teach the guidance system for a boring head, wherein Hayashi et al teaches switches for controlling adjusters that act on the drive shaft. However, the combination does not explicitly teach that the switches are grouped for joystick operation.

Tull et al also teaches the guidance system for a boring head similar to that of the combination. It is further taught that the switches are grouped for joystick operation (see Figs. 1-2 and 7, and col. 4, line 66 through col. 5, line 17). It would have been obvious to one of ordinary skill in the art, having the teachings of the combination and Tull et al before him at the time the invention was made, to modify the guidance system taught by the combination to include the joystick operation of Tull et al, in order to obtain better control of the steering of the boring head with the joystick. One would have been motivated to make such a combination since Tull et al have shown it to be notoriously known in the art to control the steering of a micro-tunneling machine with a joystick for easier operation, and because Tull et al have shown it to be notoriously known in the art that guidance systems can be used in different types of earth boring apparatus (see col. 5, lines 21-24 of Tull et al).

Response to Arguments

6. Applicant's arguments with respect to claims 13 and 14 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

7. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Follert et al, Grotenhofer, Haspert, Kajiyama et al, Stone, and Taylor et al teach various tunneling machines with varying ways of supplying fluid to the bit face.

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8. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).


A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.


9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Shane Bomar whose telephone number is 571-272-7026. The examiner can normally be reached on Monday - Thursday from 6:30am to 4:00pm. The examiner can also be reached on alternate Fridays.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Bagnell can be reached on 571-272-6999. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


David J. Bagnell
Supervisory Patent Examiner
Art Unit 3672

tsb 
June 20, 2006